

What is claimed is:

1. A voice pitch normalization apparatus for recognizing an incoming command voice uttered by a speaker based on sample data for a plurality of words, said voice pitch normalization apparatus comprising:

a voice analyzer operable to calculate a probability indicating a degree of coincidence among a target voice signal and each of the plurality of words in the sample data; and

a voice pitch normalization device operable to generate the target voice signal by changing the incoming command voice on a predetermined degree basis and operable to change the target voice signal in voice pitch until a maximum of the probabilities reaches a predetermined probability or higher.

2. The voice pitch normalization apparatus as claimed in claim 1, wherein said voice pitch normalization device is operable to increase or decrease the target voice signal on the predetermined degree basis when the maximum of the probabilities is smaller than the predetermined probability.

3. The voice pitch normalization apparatus as claimed in claim 2, wherein said voice pitch normalization device comprises:

a memory operable to temporarily store the incoming command voice;

a read-out controller operable to read out a string of the incoming command voice from said memory and generate the target voice signal; and

a read-out clock controller operable to generate a read-out clock signal with a timing clock determined by frequency, and output the timing clock to said memory to change, with a timing specified by the timing clock, a frequency of the target voice signal on the predetermined degree basis.

4. The voice pitch normalization apparatus as claimed in claim 2, wherein said voice pitch normalization device is operable to increase the target voice signal in voice pitch on the predetermined degree basis starting from a pitch level of the incoming command voice.

5. A voice pitch normalization apparatus as claimed in claim 2, wherein said voice pitch normalization device is operable to decrease the target voice signal in voice pitch on the predetermined degree basis starting from a pitch level of the incoming command voice.

6. A voice recognition device for recognizing an incoming command voice optimally normalized for voice recognition based on sample data for a plurality of words, said voice recognition device comprising:

a voice analyzer operable to calculate a probability indicating a degree of coincidence among a target voice signal and each of the plurality of words in the sample data; and

a voice pitch normalization device operable to generate the target voice signal by changing the incoming command voice on a predetermined degree basis and changing the target voice signal in voice pitch until a maximum of the probabilities reaches a predetermined probability or higher.

7. The voice recognition device as claimed in claim 6, wherein said voice pitch normalization device is operable to increase or decrease the target voice signal on the predetermined degree basis when the maximum of the probabilities is smaller than the predetermined probability.

8. The voice recognition device as claimed in claim 7, wherein said voice pitch normalization device comprises:

a memory operable to temporarily store the incoming command voice;

a read-out controller operable to read out a string of the incoming command voice from said memory and generate the target voice signal; and

a read-out clock controller operable to generate a read-out clock signal with a timing clock determined by frequency, and output the timing clock to said memory to change, with a timing specified by the timing clock, a frequency of the target voice signal on the predetermined degree basis.

9. The voice recognition device as claimed in claim 7, wherein said voice pitch normalization device is operable to increase the target voice signal in voice pitch on the predetermined degree basis starting from a pitch level of the incoming command voice.

10. The voice recognition device as claimed in claim 7, wherein said voice pitch normalization device is operable to decrease the target voice signal in voice pitch on the predetermined degree basis started from a pitch level of the incoming command voice.

11. A voice pitch normalization method for recognizing an incoming command voice uttered by a speaker based on sample data for a plurality of words, said voice pitch normalization method comprising:

generating a target voice signal by changing the incoming command voice on a predetermined degree basis;

calculating a probability indicating a degree of coincidence among the target voice signal and each of the plurality of words in the sample data; and

changing the target voice signal in voice pitch until a maximum of the probabilities reaches a predetermined probability or higher.

12. The voice pitch normalization method as claimed in claim 11, further comprising, when the maximum of the probabilities is smaller than the predetermined probability, one of increasing and decreasing the target voice signal on the predetermined degree basis.

13. The voice pitch normalization method as claimed in claim 12, further comprising:
temporarily storing the incoming command voice;
generating the target voice signal from a string of ~~said~~ the temporarily stored incoming command voice; and
determining a timing clock by frequency, in such manner as to change, with a timing specified by the timing clock, a frequency of the target voice signal on the predetermined degree basis.

14. The voice pitch normalization method as claimed in claim 12, further comprising
a-increasing the target voice signal in voice pitch on the predetermined degree basis starting from a pitch level of the incoming command voice.

15. The voice pitch normalization method as claimed in claim 12, further comprising
decreasing the target voice signal in voice pitch on the predetermined degree basis starting from a pitch level of the incoming command voice.